Delivering on the Promise of Cost-Effective Fixed Rural Broadband with TVWS

June 28, 2011

WISPA®
Wireless Internet Service Providers Association

TVWS Commercialization Status

- Chairman Genachowski has challenged the industry to develop prototype white spaces devices for CES 2012
- TVBD Database Operations and Interfaces:
  - Good progress being made in FCC and through the Wireless Innovation Forum DSA/Whitespace Interoperability Work Group
- TVBD Certification Process
  - FCC Draft Proposal is a good, workable approach
- Key Outstanding Petitions for Reconsideration (Antenna Height and Tx Spectral Mask):
  - Motorola Solutions and WISPA urge the FCC to adopt these Petitions for Reconsideration to allow for the use of TVWS to deliver cost-effective Fixed Rural Broadband

WISPA® Wireless Internet Service Providers Association

Petitions for Reconsideration

- MSI and WISPA agree that it is in the public interest to ensure that TVBDs do not interfere with licensed incumbent users of the TV Bands

- Our proposals for changes to the allowed TVBD Antenna height and required Tx Mask include compensating provisions that extend the incumbent protected contours to ensure equivalent protection

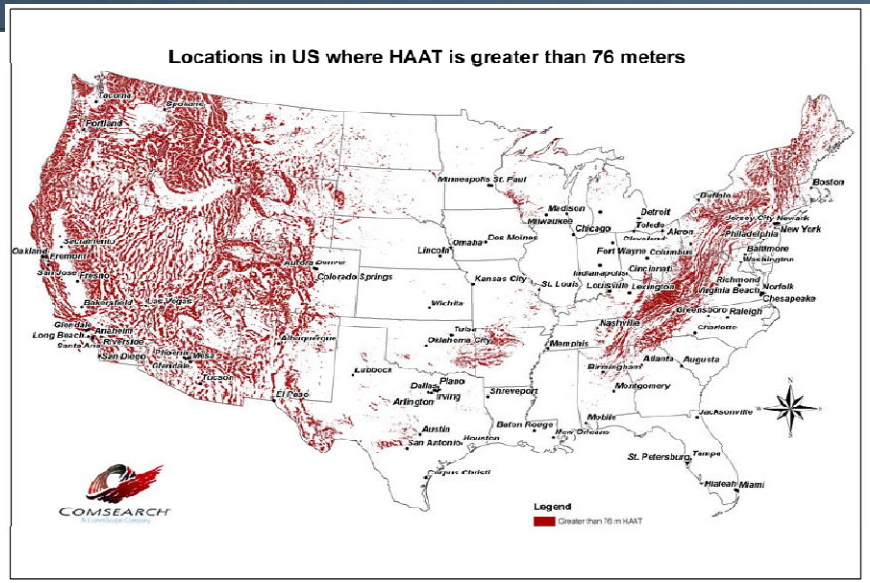
- Without adoption of these requested changes, it is doubtful that potential of TVWS to expand rural access to broadband will be fully realized

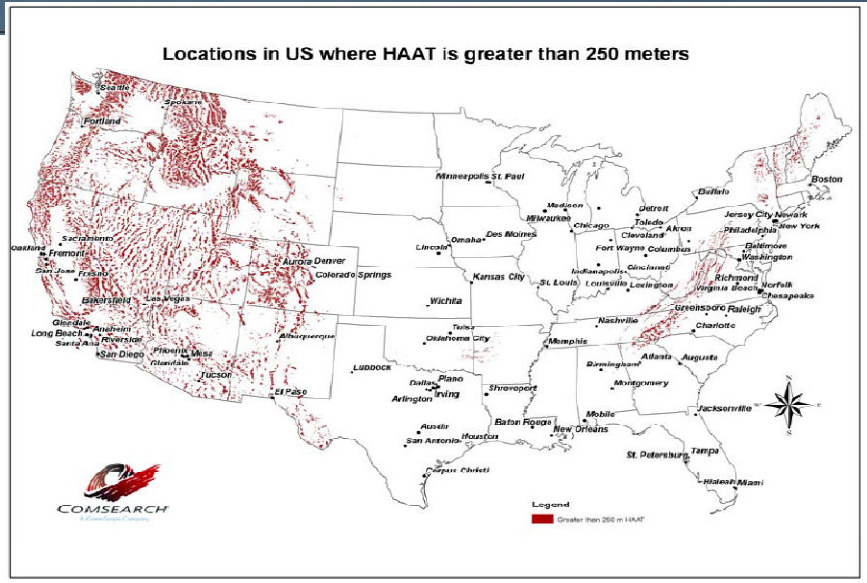
"… 72.5 percent of the 26.2 million Americans that still lack access to … broadband services reside in rural areas …"

  – From the FCC Report: "Bringing Broadband to Rural America: Update to Report on a Rural Broadband Strategy, June 17, 2011"

TVBD Antenna Height

Fixed TVBD Antenna Height

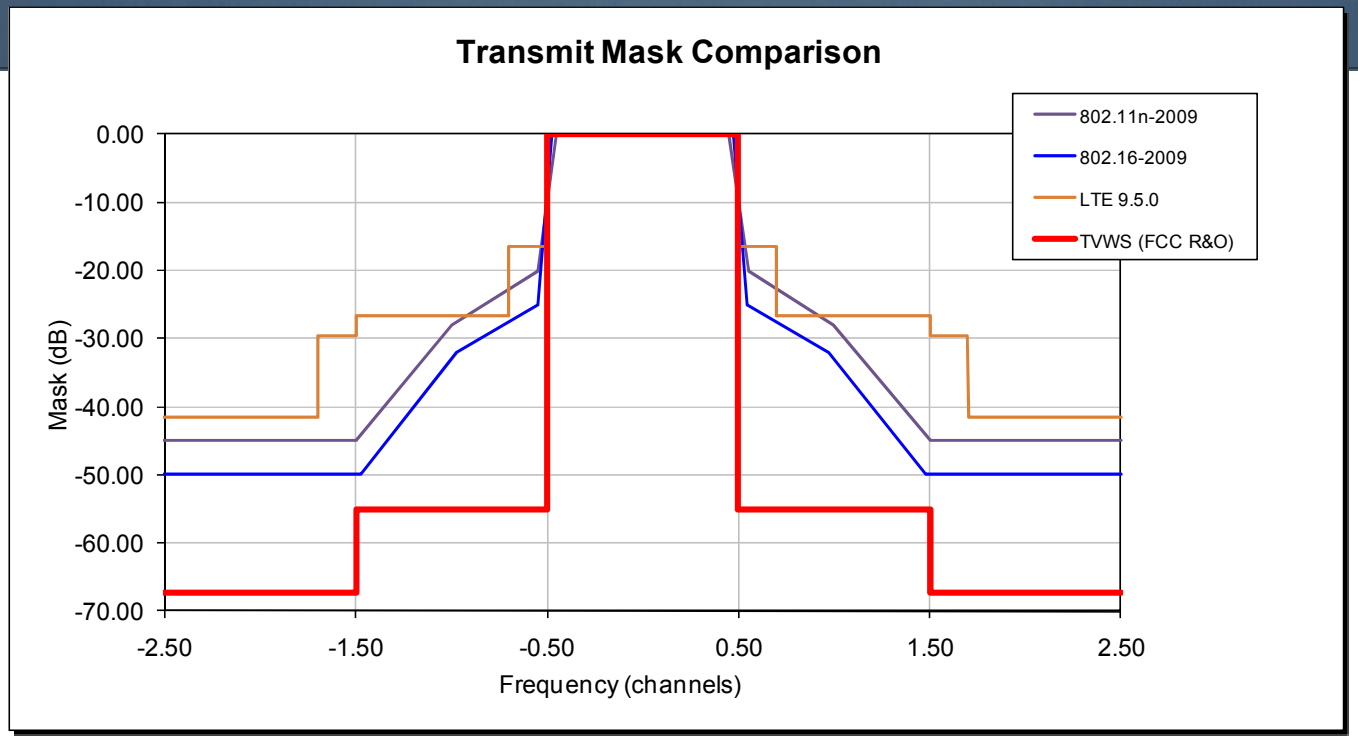




- Issues:
  - The 76 m HAAT limit for TVBD station locations will eliminate the ability to use TVWS in significant portions of the US, many of which are un / under-served rural areas
  - The 30 m AGL antenna limit will limit coverage to the extent that serving very low density areas with broadband will remain uneconomical
- Proposal:
  - 75m AGL and 250 m HAAT antenna limit with compensating larger protected contours as antenna height increases

Fixed TVBD
Transmit Spectral Mask

Fixed TVBD Transmit Spectral Mask

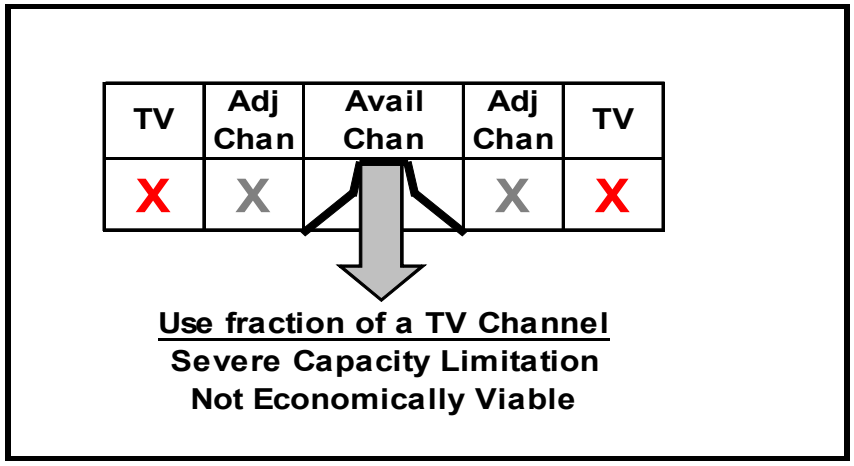


- CPE cost is the most significant contributor to cost to deliver broadband service
- Economically-viable CPE devices must take advantage of the economies of scale of 4G and WiFi technologies – low cost, highly integrated solutions
- The TVWS transmit spectral mask can be technically achieved but is significantly tighter than WiFi, WIMAX or LTE
- So high volume, spectrally efficient (4G/WiFi), low cost solutions cannot be used for TVBD

Options for Meeting Current Tx Mask

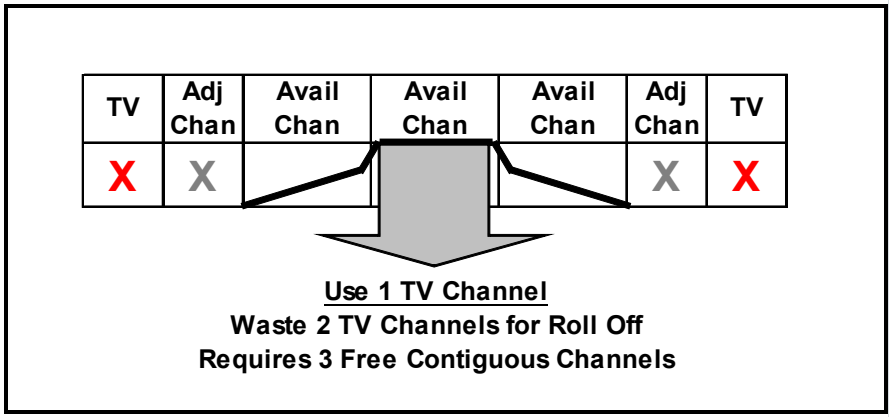
1. Custom, low volume component - based TVBD design solution:
   - High device cost drives higher monthly subscription fee to end user
   - Limits expansion of broadband access

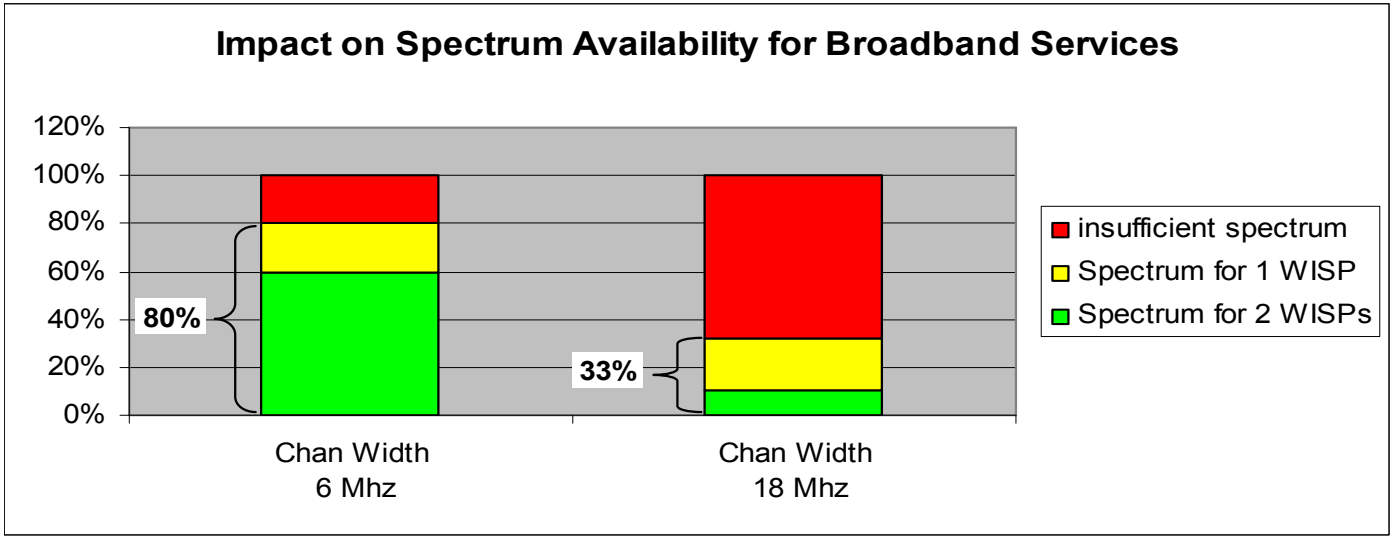
2. Use High Volume, 4G/WiFi – based TVBD design solution, but with limited occupied bandwidth
   - Insufficient throughput and capacity for an economically-viable broadband solution



Options for Meeting Current Tx Mask

3. Use High Volume, 4G/WiFi – based TVBD design solution, but use additional available TV channels for guard band
   - Significantly restricts availability of spectrum for TVWS systems

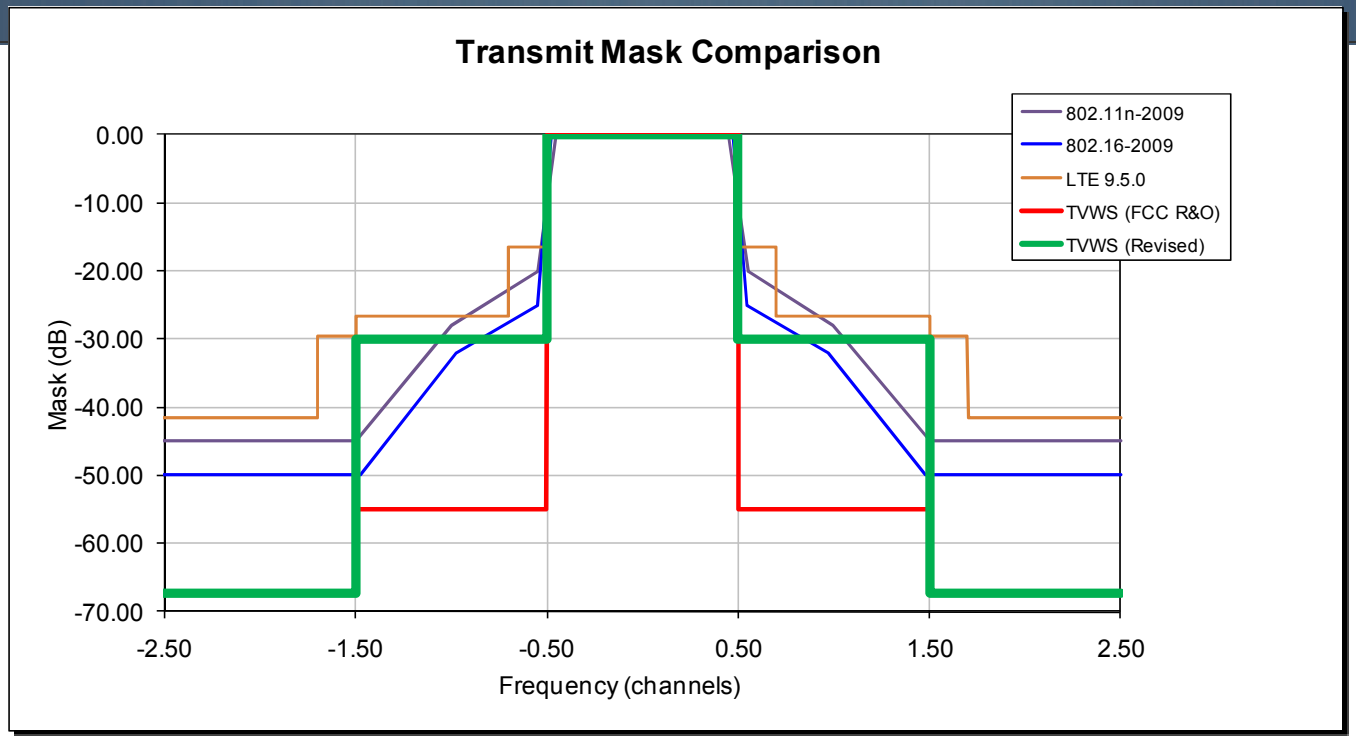




Notes:

- Based on Channel Availability (per Spectrum Bridge Database) for sample of 65 rural WISPs
- Assumes 3 Channel Frequency Plan (1x3x3) for Fixed Network

Proposed Transmit Mask Modifications



- Allow a relaxation of the transmit mask for all fixed TVBD or as an option for a newly defined fixed TVBD class
- Ensure equivalent protection for licensed incumbents by increasing the Adjacent Channel Separation Distance
- Optionally, a small (e.g. 100m) adjacent channel keep out zone could be provided around registered wireless microphones

Additional Interference Protection for Incumbents

Antenna Height Above Average Terrain for TVBD	Required Seperation (km) From Digital or Analog TV (Full Service or Low Power) Protected Contour		
	Co-Channel	Adjacent Channel (relaxed mask)	Adjacent Channel (existing mask)
Less than 3 meters	6.0 km	0.8 km	0.1 km
3 - Less than 10 meters	8.0 km	1.4 km	0.1 km
10 - Less than 30 meters	14.4 km	2.5 km	0.74 km
30 - Less than 50 Meters	20.0 km	3.3 km	
50 - Less than 75 meters	24.7 km	3.9 km	
75 - Less than 100 meters	28.2 km	4.5 km	
100 - Less than 150 meters	33.4 km	5.5 km	
150 - Less than 200 meters	37.5 km	6.3 km	
200 - Less than 250 meters	40.7 km	6.9 km	

Existing Rules Separation Distances

Proposed Rules Separation Distances

- Relaxed Tx Mask requires additional adjacent channel protected contours
- Antenna Height flexibility requires additional co-channel and adjacent channel separation distances

WISPA® Wireless Internet Service Providers Association

Summary

- Allowing an optional relaxed Tx Mask for FIXED TVBD devices will allow for the high performance, cost-effective solutions that will meet the needs of rural service providers
- More flexible site location and antenna height rules will expand the areas that can benefit from TVWS and make rural deployments more economical
- Larger incumbent protected contours are also proposed to ensure that incumbents do not experience harmful interference
- These requested changes are in the public interest and support the FCC policy objective and promise of bringing cost-effective fixed wireless broadband to rural areas

WISPA® Wireless Internet Service Providers Association